

CONCEPT, PREVALENCE, DEVELOPMENT TRENDS, AND PSYCHOPHYSIOLOGICAL ASPECTS OF INFO-DIGITAL ADDICTION

Grițenco Ella¹, Șeptițchi Vladimir², Borshev Yuri³

¹AO ABCDigital Safe Life, Chișinău, Republica Moldova,
gritenco.ella@gmail.com;

² Institute of Physiology and Sanocreatology, Moldova State University,
Chișinău, Republica Moldova;

³Almazov National Medical Research Centre, Institute of Experimental
Medicine, St. Petersburg, Russia

Abstract. *The aim of this work is to analyze current sources of scientific literature on the prevalence, key development and growth trends of Info-Digital Addiction (IDA), and its psychophysiological aspects. Modern development trends, primary psychophysiological consequences, prevalence, and main research problems of IDA have been identified. An attempt has been made to introduce a new integrated concept (a generalizing term) of "Info-Digital Addiction." A significant lack of objective statistical data on IDA in the Republic of Moldova has been revealed, highlighting the need to study and monitor the trends and factors of its development among the country's population. Only a comprehensive approach and interdisciplinary cooperation will allow for a complete understanding of the problem's scale and the development of effective prevention and treatment strategies for IDA.*

Key words. *Info-digital addiction, prevalence, development trends, psychophysiological aspects, stress.*

Introduction

The development of modern society, driven by rapid technological innovations across various spheres of life, is accompanied not only by social changes but also by physiological and psychological changes, especially among children and adolescents. Research by M. Spitzer, K. Yang, N. Kardaras, V. Dunckley, and others confirms this trend [21]. Academician Teodor Furdui, founder and a pioneer in Sanocreatology, and his colleagues note in their works that profound changes in the environment and living conditions of modern humans, driven by scientific and technological progress, lead to premature biological

degradation, directly impacting societal health and posing a critical challenge to the progressive evolution of *Homo sapiens* [10, 27, 28, 29]. Undoubtedly, the transition to a digital society is a significant factor leading to premature degradation of mental and somatic health, as well as causing psycho-emotional and informational overload. This process entails substantial changes in the habitual lifestyle of every individual, carrying not only evident benefits but also hidden threats to their health [1, 2, 4, 8].

The issue of Info-Digital Addiction (IDA) represents a condition where individuals experience psychological dependence on the use of digital technologies and information resources. This condition can have adverse effects on physical and mental health, social life, and professional activities. IDA is characterized by loss of control over the time and goals of digital technology use, disruption of social and personal functioning, and the potential development of somatic and mental disorders. This addiction is also associated with a range of negative consequences, including decreased academic performance, deterioration in quality of life, disruptions in sleep, nutrition, and immunity, as well as the development of depression, anxiety, aggression, and social isolation [11, 20, 21, 24]. This addiction affects various age groups and correlates complexly with gender, ethnic differences, and social status, underscoring the need to study and understand the psychophysiological and social aspects of this phenomenon [4, 16, 20, 22, 30].

The aim of this work is to analyze current sources of scientific literature on the prevalence, key development and growth trends of IDA, its psychophysiological aspects, as well as an attempt to introduce a new integrated concept of „Info-Digital Addiction”.

Materials and methods

To achieve the research objective, a comprehensive analysis of scientific publications, statistical data, meta-analyses, and secondary analyses was conducted. Databases such as PubMed, Scopus, Google Scholar, and electronic libraries were utilized without date restrictions for publications in English and Russian languages. Keywords included parameters characterizing Info-Digital Addiction among children and adults; adolescent behavior; attention deficit hyperactivity disorder; behavioral addiction; digital addiction; changes in brain structure and function; cognitive development; cyber addiction; digital detox; digital media usage; digital well-being; digestive diseases; disruption of activity

and rest regime; eating behavior; eyestrain; gaming disorder; hypodynamia; media consumption; motivation reduction; neurodevelopmental impact; physiological stress factors; prolonged sitting; psychological impact; sleep disturbances; smartphone addiction; social media addiction; stress; technostress; technology dependence; online engagement; mental health. Additionally, reference lists of selected publications were reviewed for further analysis.

Results and discussion

In the context of rapid development of information and communication technologies (ICT), Digital Addiction has become one of the most pressing issues of our time [8, 11, 12, 15, 19]. Digital Addiction is a phenomenon that humanity has encountered relatively recently. The scientific community defines Digital Addiction differently, lacking a unified and clear consensus on criteria for defining and diagnosing this problem, given that the issue evolves faster than knowledge in this field can accumulate. Some researchers associate this concept solely with internet addiction, considering it as compulsive internet use leading to deterioration in various spheres of a person's life [20]. Others focus on a broader spectrum of technological dependence, which includes excessive use of any digital devices and technologies, resulting in significant negative consequences for mental, physical health, and overall well-being [4, 26]. Some emphasize the connection of Digital Addiction with time spent in the digital environment, including the use of social networks, online games, and other internet resources [1, 3, 15, 21]. Thus, there is currently no unified, exhaustive concept, term, or definition for this new type of dependence associated with information and/or digital technologies. Therefore, we propose using a new integrated term – "Info-Digital Addiction" (IDA). By IDA, we propose to understand a condition characterized by compulsive and uncontrollable use of information and digital technologies, leading to significant negative consequences for mental (anxiety, depression, sleep disturbances, etc.) and/or physical health (vision impairment, musculoskeletal pain, etc.), as well as and/or social life (social isolation, deterioration of interpersonal relationships, etc.).

Based on the analysis of available literature, IDA encompasses a wide range of behavioral disorders and physiological disturbances associated with excessive use of digital devices, online services, and information resources. This addiction has serious social and medical

consequences. IDA is accompanied by the action of a number of stress factors on the body - both physiological (hypodynamia, prolonged sitting, disruption of activity and rest regime, eating behavior, eyestrain, etc.) and psychological (social isolation, loneliness, information overload, etc.). Intensive use of digital devices is often associated with physiological aspects such as eyestrain, back and neck pain, and a number of other pathologies. Psychological consequences include loss of social skills and development of psychological problems such as depression and anxiety. The impact of IDA also affects cognitive functions and adaptation to changes, which can hinder learning and social adaptation [1, 13, 19, 20, 23, 25].

According to the World Health Organization (WHO), starting from January 1, 2022, excessive involvement in computer games, which has evolved into gaming addiction, has officially been classified as a behavioral addictive disorder in the ICD-11 disease classification [17, 18]. It should be noted that this is not the only harmful pattern of "digital" behavior deserving WHO's attention. We propose not only to unite various disorders such as internet addiction, social media addiction, continuous scrolling, cybersexual addiction, and many others under the general concept of IDA, but also in the future to discuss the inclusion of the entire spectrum of addictions falling under this definition in ICD-12.

Since the concept of technology addiction began to form only in the late 20th century with the development of the internet and mobile devices, comprehensive and exhaustive global statistical data with a representative sample on this issue is unfortunately still critically low. This lack is particularly noticeable at the level of local studies, especially in Moldova. Therefore, the analysis has to be based on scattered data, which reduces the objectivity of statistics.

The main problem is that data often relate to different periods of research, and the studied cohorts are heterogeneous in terms of age, gender, cultural, and other important parameters. Regarding Moldova, it should be noted that in open access, we could find only general, approximate, and very averaged indicators that do not reflect the real situation in the Republic. The absence of such data is a serious cause for concern, as without comprehensive statistical information, it is difficult to provide a reliable assessment of the scale of the problem and to develop effective measures for the prevention and treatment of addiction to modern technologies.

Meta-analysis of data shows that IDA is widely prevalent. On average, about 24% of social media users worldwide suffer from IDA, with this figure reaching 31% in some countries [7]. According to the latest Global Digital 2024 report, the audience of social networks continues to grow. As of early 2024, there are already more than 5.04 billion active social media accounts worldwide. Over the past year, their number has increased by 266 million, which represents a growth of 5.6%. This growth is accompanied by an increase in the time spent by users on social networks, which correlates with the increase in hypodynamia and other negative factors contributing to the deterioration of the psychophysiological condition of the person. According to GWI data, the average social media user spends 2 hours and 23 minutes on them daily. Internet usage is also continuing to grow. As of early 2024, the total number of internet users worldwide is 5.35 billion, which is 66% of the world's population. Over the past year, the number of users has increased by 97 million, indicating ongoing growth in the global internet audience [30].

Studies show that various forms of IDA have a significant negative impact on the psychophysiological condition of ICT users. Excessive use of digital devices by children and adolescents is associated with sleep disturbances, increased anxiety, depression, and decreased cognitive abilities [5, 6, 20, 22, 24]. Adults suffering from IDA also experience similar problems, including increased stress levels, fatigue, and decreased productivity [1, 2, 9, 13, 14, 15]. It has also been established that the glowing screens of digital devices stimulate the brain, causing addiction comparable to narcotics [5]. The social consequences of IDA include reduced quality of interpersonal relationships, increased social isolation, and deterioration of academic performance in children and adolescents. Excessive use of ICT leads to decreased empathy and the ability to understand the emotions of others, which in turn affects social interactions [14, 15]. Both in adults and children, IDA can contribute to the development of antisocial behavior and unfounded aggression, negatively impacting both professional and personal life [1, 7].

It is noted that a significant and sharp increase in the use of information and digital technologies occurred during the COVID-19 pandemic, leading to an increase in cases of IDA globally. In conditions of lockdowns and restrictions on physical interaction, many children and adults started spending more time online, exacerbating addiction symptoms. Surveys have shown that increased screen time is associated

with worsening mental health, including increased anxiety and depressive states [6].

Key factors contributing to the growth of IDA are the availability and attractiveness of digital technologies, social norms and expectations, as well as individual user characteristics. The availability of free access to the internet and digital devices, the influence of the environment and social pressure play a significant role in the development of this type of addiction. However, individual factors such as personality traits and the mental state of the individual also need to be taken into account.

Conclusions

1. Info-Digital Addiction (IDA) represents a new integrated concept that encompasses various forms of addictions related to compulsive and uncontrollable use of information and digital technologies. Current fragmented definitions do not fully encompass the complexity and diversity of this phenomenon.

2. The prevalence of IDA among children and adults is one of the most pressing issues of modern society. With the increasing number of users of digital and information products, the number of new ICT-related addictions inevitably grows. Meta-analysis has shown that IDA is widespread. On average, about 24% of social media users worldwide suffer from IDA, with this figure reaching 31% in some countries. This process has serious consequences for mental, physical, and social health, regardless of age, social status, or gender.

3. IDA is accompanied by the impact on the body of a number of stressogenic factors, including physiological (hypodynamia, prolonged sitting, disruption of activity and rest, eye strain) and psychological (such as social isolation, information overload). The former can contribute to the development of various diseases such as musculoskeletal disorders, metabolic syndrome, obesity, diabetes, cardiovascular and digestive diseases. The latter, in turn, can lead to reduced motivation, attention deficit hyperactivity disorder, sleep disturbances, immune system impairment, and changes in brain structure and function. These factors also have a negative impact on quality of life, academic performance, social adaptation, and professional orientation.

4. The COVID-19 pandemic significantly intensified the use of digital technologies, leading to a sharp increase in cases of IDA in recent years. Lockdown conditions and restrictions on physical interaction have

contributed to increased time spent online, exacerbating addiction symptoms.

5. The acute shortage of current, relevant, and objective statistical data on IDA in Moldova underscores the need to study and monitor trends and factors in the development of this phenomenon. Only a comprehensive approach and interdisciplinary cooperation will provide a complete understanding of the scale of the problem and develop effective strategies for the prevention and treatment of IDA in Moldova.

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